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5. (Amended) The planar sensor element according to claim 1, wherein the layer structure further includes a plurality of electrically insulating layers, a first thickness of one of the electrically insulating layers being approximately equal to a second thickness of another one of the electrically insulating layers, and wherein the heating conductor is embedded in the electrically insulating layers, the electrically insulating layers being formed on both sides of the heating conductor.

REMARKS

I. Introduction

Claim 2 has been canceled herein without prejudice. Accordingly, claims 1 and 3 to 7 are pending in the present application. In view of the foregoing amendments and the following remarks, it is respectfully submitted that all of the presently pending claims are allowable, and reconsideration is respectfully requested.

II. Rejection of Claims 3 to 7 Under 35 U.S.C. § 112

Claims 3 to 7 were rejected under 35 U.S.C. § 112, second paragraph as indefinite for allegedly failing to particularly point out and distinctly claim the subject matter of the invention.

With regard to claim 3, the Office Action contends that "it is unclear what is the final sensor element being claimed." Office Action at p. 2. The second paragraph of 35 U.S.C. § 112 merely requires that the claims set out and circumscribe a particular subject matter with a reasonable degree of clarity and particularity. Claim 3 recites that "the planar sensor element is formed using a sintering process," that "before the layer structure is sintered, the measuring cell layer includes at least two measuring cell layer foils and the covering layer includes at least one covering layer foil, the covering layer foil having a predetermined thickness," and "a total thickness of the at least two measuring cell layer foils is at least approximately equal to the predetermined thickness." It is respectfully submitted that the claim 13 as a whole apprises one of ordinary skill in the art of its scope and therefore satisfies the requirements of 35 U.S.C. § 112.

With regard to claim 5, the Examiner will note that claim 5 has been amended herein to change "a heating conductor" to --the heating conductor--. It is

therefore respectfully submitted that claim 5 fully complies with the requirements of 35 U.S.C. § 112.

In view of the foregoing, it is respectfully submitted that claims 3 to 7 fully comply with the requirements of 35 U.S.C. § 112, and withdrawal of this rejection is therefore respectfully requested.

III. Rejection of Claims 1 to 5 Under 35 U.S.C. § 102(b) - Yamada '806

Claims 1 to 5 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 4,505,806 ("Yamada '806"). Applicants respectfully submit that Yamada '806 does not anticipate the present claims for the following reasons.

Claim 1 relates to a planar sensor element for determining at least one gas component and recites that the planar sensor element includes a layer structure. Claim 1 recites that the layer structure includes a measuring cell layer, a covering layer, a heating element disposed between the measuring cell layer and the covering layer and generating a heating power, and a layer-shaped heating conductor embedded in the heating element. Claim 1 further recites that the layer-shaped heating conductor is arranged in a layer plane of the layer structure to obtain an at least approximately homogeneous distribution of the heating power over a cross-section of the sensor element perpendicular to the layer structure. Claim 1 has been amended herein to recite that the layer plane is centered with respect to the sensor element, which was recited in claim 2, now canceled.

Yamada '806 purports to relate to an oxygen sensor. The Office Action contends that Yamada "'806 discloses . . . a heating conductor 16a located in a plane approximately half way between the top and the bottom of a sensor element" and that "[l]ayer 13'a can be considered to be the 'measuring cell layer', while the bottom layer can be considered to be the covering layer." Office Action at p. 2. The foregoing belies the description of Yamada '806.

Yamada '806 states at col. 6, lines 30 to 31 that "FIG. 7 and FIG. 8 show a second embodiment of the oxygen sensor," and Yamada '806 states at col. 6, lines 51 to 52 that "FIG. 9 [is] a perspective view of the assembled oxygen sensor according to the second embodiment." The only difference between the second embodiment of the oxygen sensor and the first embodiment of the oxygen sensor is that the second embodiment is stated to include a heat-generating resistor 16a. However, Yamada '806 states at col. 3, line 30 that the oxygen sensor includes an

oxygen pump element 1 and states at col. 3, line 53 that the oxygen sensor includes an oxygen concentration cell element 4. Yamada '806 further states at col. 4, lines 4 to 6 that "[a]n intermediate board member 7 is sandwiched between the oxygen pump element 1 and the oxygen concentration cell element 4." With regard to the oxygen pump element 1, Yamada '806 states at col. 6, lines 1 to 8 that "[a] DC voltage of 10 V was applied across the electrode layers 3a of the oxygen pump element 1 through a variable resistor 17, so as to vary the direct current I through the element 1 in a range of 0.05 - 10 mA for pumping out oxygen from the gas in the cavity at the hole 8 in a controllable fashion" and that "output voltage of the oxygen concentration cell element 4 was controlled at 20 mV." Thus, neither the oxygen pump element 1, the oxygen concentration cell element 4, the element denoted 13'a in Figure 9 nor the bottom layer illustrated in Figure 9 can be properly considered a "covering layer" within the context of the present claims. Furthermore, there is no disclosure or suggestion that a heating power distribution over a cross-section of the oxygen sensor is at least approximately homogeneous perpendicular to the layer structure as recited in claim 1.

To anticipate a claim, each and every element as set forth in the claim must be found in a single prior art reference. Verdegaal Bros. v. Union Oil Co. of Calif., 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). Furthermore, "[t]he identical invention must be shown in as complete detail as is contained in the . . . claim." Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989). That is, the prior art must describe the elements arranged as required by the claims. In re Bond, 910 F.2d 831, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990). The Office Action's contentions that "[l]ayer 13'a can be considered to be the 'measuring cell layer'" and that "the bottom layer can be considered to be the covering layer" demonstrates that the anticipation rejection is flawed. Such analysis ignores the fact that the terms and phrases of a claim are to be understood based on a reasonable interpretation of those terms and phrases in the context of the specification. As more fully set forth above, it is respectfully submitted that Yamada '806 does not disclose, or even suggest, the "covering layer" or the arrangement of the layer-shaped heating conductor in a layer plane of the layer structure to obtain an at least homogeneous distribution of the heating power over a cross-section of the sensor element perpendicular to the layer structure as recited in claim 1.

Additionally, to reject a claim under 35 U.S.C. § 102, the Examiner must demonstrate that each and every claim limitation is contained in a single prior art reference. See, Scripps Clinic & Research Foundation v. Genentech, Inc., 18 U.S.P.Q.2d 1001, 1010 (Fed. Cir. 1991). Still further, not only must each of the claim limitations be identically disclosed, an anticipatory reference must also enable a person having ordinary skill in the art to practice the claimed invention, namely the inventions of the rejected claims, as discussed above. See, Akzo, N.V. v. U.S.I.T.C., 1 U.S.P.Q.2d 1241, 1245 (Fed. Cir. 1986). In particular, it is respectfully submitted that, at least for the reasons discussed above, the reference relied upon would not enable a person having ordinary skill in the art to practice the inventions of the rejected claims, as discussed above. Also, to the extent that the Examiner is relying on the doctrine of inherency, the Examiner must provide a "basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristics necessarily flows from the teachings of the applied art." See M.P.E.P. § 2112; emphasis in original; and see, Ex parte Levy, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Inter. 1990). Thus, the M.P.E.P. and the case law make clear that simply because a certain result or characteristic may occur in the prior art does not establish the inherency of that result or characteristic. Accordingly, the anticipation rejection as to the rejected claims must necessarily fail for the foregoing reasons.

In summary, it is respectfully submitted that Yamada '806 does not anticipate claim 1.

As for claims 3 to 5, which ultimately depend from claim 1 and therefore include all of the limitations of claim 1, it is respectfully submitted that Yamada '806 does not anticipate these dependent claims for at least the same reasons given above in support of the patentability of claim 1.

Because claim 2 has been canceled herein without prejudice, the present rejection is rendered moot with respect to claim 2.

In view of the foregoing, it is respectfully submitted that Yamada '806 does not anticipate claims 1 and 3 to 5. Withdrawal of this rejection is therefore respectfully requested.

IV. Rejection of Claims 1 to 5 Under 35 U.S.C. § 102(b) - Yamada '807

Claims 1 to 5 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 4,505,807 ("Yamada '807"). Applicants respectfully submit that Yamada '807 does not anticipate the present claims for the following reasons.

Yamada '807 purports to relate to an oxygen sensor. In support of the present rejection, the Office Action merely states that Yamada "'807 discloses . . . a measuring cell layer 2, a covering layer 1 and a heating conductor 13 located in a plane approximately half way between the top and the bottom of a sensor element." Office Action at p. 3. Yamada '807 states at col. 3, lines 23 to 26 that an oxygen sensor includes an oxygen concentration cell element 1, an oxygen pump element 2 and a heater element 3. None of these elements define a "covering layer" in the context of the present claims. Furthermore, in view of insulating coating 6, which is stated to be applied to the surface of the insulating plate of the heater element 3, it is respectfully submitted that Yamada '807 specifically fails to disclose the limitation that "the layer-shaped heating conductor is arranged in a layer plane of the layer structure to obtain an at least approximately homogeneous distribution of the heating power over a cross-section of the sensor element perpendicular to the layer structure" as recited in claim 1. Furthermore, as illustrated in Figure 2, Yamada '807 fails to disclose that the layer plane is centered with respect to the sensor element as recited in amended claim 1.

In view of all of the foregoing, it is respectfully submitted that Yamada '807 does not anticipate claim 1 as amended herein.

As for claims 3 to 5, which ultimately depend from claim 1 and therefore include all of the limitations of claim 1, it is respectfully submitted that Yamada '807 does not anticipate these dependent claims for at least the same reasons given above with respect to claim 1.

With regard to claim 2, it is respectfully submitted that the cancellation herein of claim 2 without prejudice renders moot the present rejection with respect to claim 2.

In view of the foregoing, it is respectfully submitted that Yamada '807 does not anticipate claims 1 and 3 to 5. Withdrawal of this rejection is therefore respectfully requested.

V. Rejection of Claims 1 to 7 Under 35 U.S.C. § 103(a)

Claims 1 to 7 were rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 5,529,677 ("Schneider et al.") in view of Yamada '806 or Yamada '807. Applicants respectfully submit that the combination of Schneider et al. and Yamada '806 or Yamada '807 does not render obvious the present claims for the following reasons.

The Office Action contends that "Schneider [et al. disclose] applicant's basic sensor element including a measuring cell layer 14/22, a covering layer 29 and a heating conductor 27 sandwiched by two insulating layers and surrounded by a sealing frame." Office Action at p. 3. The Office Action admits that "Applicant's claims differ by calling for the heating conductor to be located in a plane centered between the top and the bottom of the sensor element." Office Action at p. 3. However, the Office Action contends that "[i]t would have been obvious for Schneider [et al.] to locate his heating conductor in a centered plane as shown by either Yamada, because such a location would permit even heat distribution between the top and the bottom of the sensor element" and that "[t]emperature gradient within a sensor element may cause inaccurate measurement as well as cause thermal shock damage." Office Action at p. 3.

Schneider et al. purport to relate to a planar polarographic sensor for determining the lambda value of gas mixtures. Schneider et al. refer to three embodiments, each of which is stated to include a heating unit C having a heater 27. In none of the three embodiments is the heater 27 arranged between the measuring cell layer and the covering layer to obtain at least an approximately homogeneous distribution of heating power over a cross-section of the sensor element perpendicular to the layer structure as recited in claim 1. Furthermore, as admitted in the Office Action, Schneider et al. do not disclose that the layer plane is centered with respect to the sensor element as recited in amended claim 1. Moreover, as described, for example, on page 1, lines 25 to 29 of the Specification, "[d]ue to [the] highly asymmetrical arrangement of the heating element [described by Schneider et al.] with respect to the layer sequence of the layer structure, the cover foil heats up much more than the layer structure provided with function layers."

In rejecting a claim under 35 U.S.C. § 103(a), the Examiner bears the initial burden of presenting a prima facie case of obviousness. In re Rijckaert, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). To establish prima

facie obviousness, three criteria must be satisfied. First, there must be some suggestion or motivation to modify or combine reference teachings. In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). This teaching or suggestion to make the claimed combination must be found in the prior art and not based on the application disclosure. In re Vaeck, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). Second, there must be a reasonable expectation of success. In re Merck & Co., Inc., 800 F.2d 1091, 231 U.S.P.Q. 375 (Fed. Cir. 1986). Third, the prior art reference(s) must teach or suggest all of the claim limitations. In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974).

As indicated above, neither Yamada '806 nor Yamada '807 discloses, or even suggests, the arrangement of the heating element as recited in claim 1. Moreover, as admitted in the Office Action, Schneider et al. do not disclose, or even suggest, the arrangement of the heating element as recited in claim 1. It is therefore respectfully submitted that the rejection must necessarily fail. Furthermore, the reasons stated in the Office Action to support the contention that it would have been obvious to combine Schneider et al. and Yamada '806 or Yamada '807 can only be found in the present application and not in the disclosures of Schneider et al., Yamada '806 or Yamada '807. The Office Action states that "[t]emperature gradient within a sensor element may cause inaccurate measurements as well as cause thermal shock damage." Office Action at p. 3. The Office Action provides no support in the cited references for this contention. However, the present application states, for example, at page 1, lines 29 to 31 of the Specification that "[t]he non-homogeneous distribution of the heating power [in the sensor element described by Schneider et al.] results in increased heat shock sensitivity of the planar sensor element when the temperature varies." (emphasis added). Furthermore, the Specification states at page 1, line 34 to page 2, line 3:

The planar sensor element according to the present invention is advantageous in that the heating power is homogeneously distributed over the cross-section of the sensor element. Thus, a resistance of the sensor element to temperature variations and thermal shock is improved. (emphasis added).

It is therefore respectfully submitted that the obviousness determination is improperly based solely on the Specification of the present application and not on the references cited as required.

Moreover, it is respectfully submitted that the cases of In re Fine, supra, and In re Jones, 21 U.S.P.Q.2d 1941 (Fed. Cir. 1992), make plain that the Office Action's generalized assertions that it would have been obvious to modify or combine the references do not properly support a § 103 rejection. It is respectfully submitted that those cases make plain that the Office Action reflects a subjective "obvious to try" standard, and therefore does not reflect the proper evidence to support an obviousness rejection based on the references relied upon. In particular, the Court in the case of In re Fine stated that:

The PTO has the burden under section 103 to establish a *prima facie* case of obviousness. It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. This it has not done. . . .

....
Instead, the Examiner relies on hindsight in reaching his obviousness determination. . . . One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.

In re Fine, 5 U.S.P.Q.2d at 1598 to 1600 (citations omitted; italics in original; emphasis added). Likewise, the Court in the case of In re Jones stated that:

Before the PTO may combine the disclosures of two or more prior art references in order to establish *prima facie* obviousness, there must be some suggestion for doing so, found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. . . .

Conspicuously missing from this record is any evidence, other than the PTO's speculation (if it be called evidence) that one of ordinary skill . . . would have been motivated to make the modifications . . . necessary to arrive at the claimed [invention].

In re Jones, 21 U.S.P.Q.2d at 1943, 1944 (citations omitted; italics in original).

That is exactly the case here since it is believed and respectfully submitted that the present Office Action, as well as all previous Office Actions to date, offers no evidence whatsoever, but only conclusory hindsight, reconstruction

and speculation, which these cases have indicated does not constitute evidence that will support a proper obviousness finding. Unsupported assertions are not evidence as to why a person having ordinary skill in the art would be motivated to modify or combine references to provide the claimed subject matter of the claims to address the problems met thereby. Accordingly, the Office must provide proper evidence of a motivation for modifying or combining the reference to provide the claimed subject matter.

More recently, the Federal Circuit in the case of In re Kotzab has made plain that even if a claim concerns a “technologically simple concept” -- which is not the case here -- there still must be some finding as to the “specific understanding or principle within the knowledge of a skilled artisan” that would motivate a person having no knowledge of the claimed subject matter to “make the combination in the manner claimed,” stating that:

In this case, the Examiner and the Board fell into the hindsight trap. The idea of a single sensor controlling multiple valves, as opposed to multiple sensors controlling multiple valves, is a technologically simple concept. With this simple concept in mind, the Patent and Trademark Office found prior art statements that in the abstract appeared to suggest the claimed limitation. But, there was no finding as to the specific understanding or principle within the knowledge of a skilled artisan that would have motivated one with no knowledge of Kotzab's invention to make the combination in the manner claimed. In light of our holding of the absence of a motivation to combine the teachings in Evans, we conclude that the Board did not make out a proper prima facie case of obviousness in rejecting [the] claims . . . under 35 U.S.C. Section 103(a) over Evans.

In re Kotzab, 55 U.S.P.Q.2d 1313, 1318 (Fed. Cir. 2000) (emphasis added). Again, it is believed that there have been no such findings.

Accordingly, there is no evidence that the references relied upon, whether taken alone, combined or modified, would provide the features and benefits of claim 1 as amended herein. It is therefore respectfully submitted that amended claim 1 is allowable for these reasons.

As for claims 3 to 7, which ultimately depend from claim 1 and therefore include all of the limitations of claim 1, it is respectfully submitted that the combination of Schneider et al. and Yamada '806 or Yamada '807 does not render obvious these dependent claims for at least the same reasons given above in

support of the patentability of claim 1. In re Fine, supra (any dependent claim depending from a non-obvious independent claim is non-obvious).

Because claim 2 has been canceled herein without prejudice, the present rejection is moot with respect to claim 2.

In view of the foregoing, it is respectfully submitted that the combination of Schneider et al. and Yamada '806 or Yamada '807 does not render obvious the present claims as amended herein. Withdrawal of this rejection is therefore respectfully requested.

VI. Conclusion

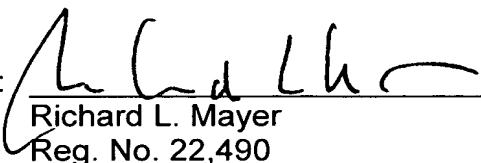
Attached hereto is a marked-up version of the changes made to the claims by the current Amendment. The attached page is captioned "**Version with Markings to Show Changes Made.**"

It is therefore respectfully submitted that all of the presently pending claims are allowable. All issues raised by the Examiner having been addressed, an early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

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PATENT TRADEMARK OFFICE

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claim 2 has been canceled without prejudice.

Claims 1 and 5 have been amended as follows:

1. (Five Times Amended) A planar sensor element for determining at least one gas component, comprising:

a layer structure including:

a measuring cell layer;

a covering layer;

a heating element disposed between the measuring cell layer and the covering layer and generating a heating power, a layer-shaped heating conductor being embedded in the heating element,

wherein the layer-shaped heating conductor is arranged in a layer plane of the layer structure to obtain an at least approximately homogeneous distribution of the heating power over a cross-section of the sensor element perpendicular to the layer structure; and

wherein the layer plane is centered with respect to the sensor element.

5. (Amended) The planar sensor element according to claim 1, wherein the layer structure further includes a plurality of electrically insulating layers, a first thickness of one of the electrically insulating layers being approximately equal to a second thickness of another one of the electrically insulating layers, and [further comprising:

a] wherein the heating conductor is embedded in the electrically insulating layers, the electrically insulating layers being formed on both sides of the heating conductor.